

RECORD OF TELEPHONIC INTERVIEW

A Telephonic Interview was conducted between Applicants' representative, the Examiner and the Examiners' supervisor on June 6, 2006. The rejection under 103(a) was discussed and the Examiner's supervisor pointed out that the claims did not indicate the non-scheduling activity directly. Applicant's representative indicated that amendment would be made to specifically recite the non-scheduling action of the invention.

REMARKSClaim Objections

The Examiner has objected to Claims 3, 13, 18, 23 and 28 based on lack of antecedent basis for elements and other informalities. Applicants have amended the objected-to claims to overcome the objections and therefore believe that the objections have been overcome.

Rejections under 35 U.S.C. §103

The Examiner has rejected Claims under 35 U.S.C. §103(a) as being unpatentable over Maitra (U.S. 5,623,647) in view of Tobias (U.S. 6,996,441). Applicants respectfully disagree, but have amended the Claims to more specifically point out features of the present invention.

Claim 1 (and similarly other independent claims 11 and 21) recites:

"A method of managing energy in a processing system, comprising:

receiving an indication of a need to reduce a energy usage level in said processing system at a scheduler;

determining whether or not a next process to be scheduled has an associated level of energy usage greater than a threshold; and

selectively scheduling an execution slice for said next process in response to determining that said associated level of energy usage does not exceed said threshold, and not scheduling said execution slice for said next process in response to determining that said associated level of energy usage does exceed said threshold."

[**Bold text added for emphasis**]

The claims at issue include elements that selectively schedule process execution slices in conformity with an expected energy usage level. If the energy usage level will exceed a threshold if a slice for a next process is scheduled, then the slice is not scheduled, otherwise the slice is scheduled.

Maitra discloses controlling the energy usage of the system by reducing the frequency of the system clock according to a clock scheduler running in parallel with the slice scheduler, but does not disclose forgoing the scheduling of the execution slice altogether. It appears from the Examiner's rejection of previous Claim 1 that the Examiner has interpreted "selectively scheduling" as not requiring the negative case of not scheduling, as is now recited in the amended Claims.

However, applicants also respectfully point out that the Examiner's statements are incorrect regarding Maitra with respect to the rejection of Claim 10, which recites in essence: scheduling one process over another after determining that the process being scheduled has a lower energy usage. Since the question of scheduling another process in preference to another necessarily implies not scheduling the non-preferred process, at least at the next interval, it is therefore necessary to clarify the disclosure of Maitra in this regard. The Examiner indicates

that Maitra discloses that the scheduler "schedules a second process having a lower level of energy usage than the next process in preference over the next process" in the Office Action at Page 8, paragraph 1, and cites to Maitra at col. 4 lines 44-55. However, applicants respectfully point out that the cited text, which provides a long list of criteria that can be used to determine process priority for scheduling, consisting of: time limits, number of open files, memory requirements and I/O to CPU burst ratios, does not indicate a preference for higher or lower energy usage process at all.

Further, with respect to the Examiner's rejection of Claim 1, the Examiner indicates on page 3, lines 23-24 of the Office Action that "the scheduler retrieves information needed to determine if the CPU clock needs to be throttled", implying that Maitra discloses performing power management with the scheduler, citing Maitra at col. 4, lines 56-64 and col. 8 line 45 through col. 9 line 4. However, applicants respectfully point out that the cited passage at col. 4 describes only setting a CPU clock frequency "appropriate" for the application being executed, and at col. 8., line 67, et seq., specifically states that the clock scheduling unit adjusts the speed of the microprocessor to meet the computing requirement of the application, not the converse as implied by the Examiner's arguments.

Therefore Maitra should be understood to disclose a method and system quite distinct from the present invention in that while the present invention controls system power by selectively not scheduling processes that have consumption exceeding a threshold, Maitra controls system power when possible, i.e., when applications are not requiring a maximum clock speed. (See e.g., Maitra at the Abstract; col. 2, lines 29-36; col. 2, lines 39-42; col. 2, lines 55-57; and col. 6, lines 1-55.)

The Examiner indicates on page 10 of the Office Action that Tobias discloses "thresholds of the power usage dependent on various performance characteristics" that in combination with Maitra would yield an OS scheduler having "the capability of determining whether future processes exceed an energy threshold and scheduling extra execution slices if said threshold is not exceeded." First, applicants respectfully point out that the above does not describe the invention, as claimed, which concerns scheduling or not scheduling execution slices selectively in response to determining whether or not the next slice will cause system power usage to exceed a threshold. Second, applicants further respectfully point out that Tobias does not disclose a mechanism nor a methodology that can determine the energy level of a next process to be scheduled and that can determine whether or not that energy level exceeds a threshold, as recited in the claims. The "predictive" mechanism in Tobias is a prediction of

heat removal requirements "based, for example, on the frequency and voltage at which the CPU is running or based on other system performance indicators." Tobias at col. 4, lines 32-33. Such a predictor may measure past usage of system power, but does not provide a per-process prediction of energy usage.

Therefore, neither Maitra nor Tobias nor their combination disclose or suggest the present invention, as the combination does not disclose the totality of the claim elements, following the Maitra reference would lead a person of ordinary skill in the art away from the present invention as claimed and Tobias does not supply additional enabling disclosure that would permit a person of ordinary skill to modify Maitra to make and use the present invention as claimed, even with the benefit of impermissible hindsight.

Therefore, for all of the reasons stated above, Applicants believe that the rejection under 35 U.S.C. §103(a) has been overcome.

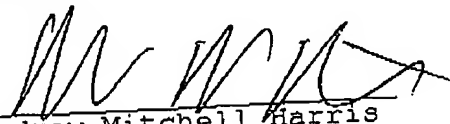
Therefore, for all of the reasons stated above, applicants believe that all of the rejections and objections have been overcome.

CONCLUSION

In conclusion, Applicants respectfully submit that this Amendment is fully responsive to all aspects of the objections and rejections tendered by the Examiner in the Office Action. Applicants respectfully submit that they have persuasively demonstrated that the above-identified Patent Application, including Claims 1-30 are in condition for allowance, and such action is earnestly solicited.

No fees should be incurred by this Amendment, but if there are any fees incurred by this Amendment, please deduct them from IBM Deposit Account NO. 09-0447.

Respectfully Submitted,

  
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